

Name_____ Period_____

How Does DNA Determine the Traits of an Organism

Introduction: In this simulation, you will examine the DNA sequence of a fictitious organism – the Snork. Snorks were discovered on the planet Dee Enae in a distant solar system. Snorks only have one chromosome with nine genes on it. Your job is to analyze the genes of its DNA and determine what traits the organisms has and then sketch the organism (You can be creative here).

For simplicity, the gene sequences are much smaller than – real – gene sequences found in living organisms. Each gene has two versions that result in a different trait being expressed in the snork.

Genes	Amino Acid Sequence	Description
Gene 1 – body covering	val – ser – leu	hairless
	val – ser – lys	hairy
Gene 2 – body style	tyr – pro – glu – glu – lys	plump
	val – pro – thr – glu – lys	skinny
Gene 3 – legs	leu – leu – leu – pro	3 legged
	leu – leu – ser – ala	2 legged
Gene 4 – head shape	ala – val – val	round head
	val – ala – ala	square head
Gene 5 – tails	his – iso	tail
	his – his	no tail
Gene 6 – body pigment	ser – pro – val	blue pigment (hair/skin)
	val – phe – tyr	red pigment (hair/skin)
Gene 7 – eyes	asp – iso – leu – leu – pro – thre	small slanted eyes
	asp – iso – pro – pro – pro – thre	large round eyes
Gene 8 – mouth	val – asp – asp – ala	circle mouth
	asp – asp – asp – ala	rectangular mouth
Gene 9 – ears	phe – ser – his	pointed standing – up ears
	phe – phe – his	rounded floppy ears

The following DNA sample was taken from a volunteer snork. Your job is to (1) transcribe the DNA sequence into mRNA, (2) translate the mRNA sequence into an amino acid sequence, and (3) determine the phenotype based on the sequence. Remember that AUG is a start codon, and it signifies the beginning of each gene. UAA is a stop codon and signifies the end of a gene. The genes are in order from gene 1-9.

Snapple Snork

TAC | CAG TCG TTT | ATG GGG GTT GTC TTT | GAG AAT TCA CGC | CAA CGC CGA |
GTG TAA | AGA GGG CAT | TTA TAA GAG GAG GGG TGG | CAA TTA TTA CGT | AAG
AAA GTA | ATT

Transcription-mRNA

Translation- Amino Acid Sequence

Phenotype- Drawing

Snoopy Snork

TAC | CAT AGG GAG | ATG GGG GTT GTC TTT | AAT AAC GAC GGG | CAC CGT CGA |
GTA TAA | AGA GGG CAT | TTG TAA GAA GAC GGG TGT | TTA TTG TTA CGC | AAA
AGA GTG| ATT

Transcription-mRNA

Translation- Amino Acid Sequence

Phenotype- Drawing